CLAIMS

1. An image processing system comprising 3D image data processing means (10) of automatic mapping a 3-D Surface Model onto the surface of an object of interest in a 3-D image, for estimating a model-based 3-D segmentation surface, comprising visualizing means (60) and further comprising:

means of interactive adaptation (20) of the segmentation surface to the actual surface of the object of interest including:

means of interactive selection (40) of a 2D data plane (DP) that intersects the 3-D segmentation surface along a 2-D Model Curve (MC), said Data Plane having a user-selected orientation with respect to said surface, which is appropriate for the user to visualize a 2-D portion called Aberrant Curve (AC)of said Model Curve to be modified;

means of interactive definition of a Guiding Curve (GC) in the 2-D Data Plane;

means of interactive adaptation of said Aberrant Curve (AC) to said Guiding Curve (GC); and

means of further automatically adapting the 3D segmentation surface within a neighborhood of the interactively adapted Aberrant Curve.

2. The system of Claim 1, having user-controlled drawing means to define a User Curve (UC), User Points including end points on the User Curve for the processing system to draw the Guiding Curve (GC) through the User Points between the end points and for the interactive adaptation means (20) to adapt the Aberrant Curve (AC) to said Guiding Curve (GC).

3. The system of Claim 2, wherein the interactive adaptation means (20) has processing means to calculate intersection points (MEP) of the segmentation surface with the Data Plane (DP), and user-actuated selection means to select particular intersection points as end points of the Aberrant Curve (AC) and intersections points, called Aberrant Points (AP) located on the Aberrant Curve between said end points.

4. The system of Claim 3, wherein the interactive adaptation means (20) has processing means to calculate Guiding Points located on the Guiding Curve corresponding to the Aberrant points on the Aberrant Curve.

5. The system of Claim 4, wherein the interactive adaptation means (20) has processing means to define motion vectors between Aberrant points on the Aberrant Curve and corresponding Guiding Points on the Guiding Curve for locally mapping the Aberrant Curve onto the Guiding Curve using said motion vectors.

6. The system of Claim 5, wherein the interactive adaptation means (20) has processing means for iterative adaptation of the region around the Aberrant Curve onto a region around the Guiding Curve, with evolution of weighting factor in function of iteration steps.

7. The system of one of Claim 1 to 6, wherein the Surface model is a Mesh model.

8. The system of Claim 7, comprising:

Acquisition means for acquiring a three-dimensional image of an object of interest to be segmented,

Automatic segmentation means (10) for generating a Mesh Model, formed of polygonal faces with common edges and nodes and automatically deforming the Mesh Model in order to map said Mesh Model onto said object of interest for yielding the segmentation surface;

Interactive adaptation means (20) for interactively adapting said Mesh Model in order to locally modify regions of the Mesh Model, wherein the intersection points of the Model Surface on the Aberrant Curve are intersection points of face edges, called Mesh edge Points, with the Data Plane; the motion vectors are defined between said Mesh Edge Points and corresponding Guiding Points of the Guiding Curve; and the motion vectors are used to modify the face nodes around said Mesh Edge Points to provide adapted points around the Guiding Curve.

9. The system of Claim 7, wherein the interactive adaptation means (20) has iterative processing means for iterative adaptation of the region around the Aberrant Curve onto a region around the Guiding Curve, with evolution of internal forces in function of iteration steps.

10. The system of one of Claims 7 to 9, wherein the interactive adaptation means (20) has iterative processing means for iterative adaptation of the region around the Aberrant Curve onto a region around the Guiding Curve, with evolution of resolution in function of iteration steps.

11. The image processing system of one of Claims 1 to 10, further comprising means for:

Taking a decision to stop the process of interactive adaptation or automatic segmentation of the Surface Model onto the object of reference in function of a predetermined fitness level.

12. The system of one of Claims 1 to 11, having display means to display 3D views of the segmentation surface, 3D and/or 2D views of the Data Plane, 3D and/or 2D views of the data plane intersection, called Model Curve (MC), with the segmentation surface, with or without highlighting said Model Curve (MC), said views being displayed one at a time or several at a time.

13. A medical imaging system comprising a suitably programmed computer or a special purpose processor having circuit means, which are arranged to form an image processing system as claimed in one of Claims 1 to 12 to process medical image data;

14. A medical examination imaging apparatus having:
Means to acquire a three-dimensional image of an organ of a body; and
a system according to one of Claims 1 to 13.

15. A computer program product comprising a set of instructions to be used in a system as claimed in one of Claims 1 to 13.